

With one exception, all populations are probably submerged annually or near-annually during high river flows in the late spring and early summer. My estimate is that they are under water with flows of 18,000 to 20,000 cubic feet per second (cfs) at the Heise Gauge, possibly less. The maximum allowed by the Bureau of Reclamation, who controls discharge from Palisades Dam, is 24,500 cfs (Martin 1998). The only population that does not appear to be flooded during these events is on Kelly's Island (EO#001), which is the only population dominated by *Eleocharis rostellata* in Idaho (discussed below). All populations were under water in June 1997, when river flows at Heise reached 43,000 cfs. This is an unprecedented level since the closure of Palisades Dam in November 1956, but is considered a 10-year flow event prior to Palisades (Martin 1998).

Within the floodplain forests of the Snake River, Ute ladies tresses occupies four distinct cover types. Two of these types, *Eleocharis rostellata* and *Elaeagnus commutata*, have been recognized as community types in riparian and wetland classifications (Jankovsky-Jones 1997a) and tend to occur as larger-scale patches on the Snake River. The other two, *Salix exigua*/*Agrostis stolonifera* and *Equisetum variegatum*, are rarer and occur as small-scale patches within the cottonwood forests. Each cover type is described below. Refer to the occurrence records in Moseley (1997b) for the distribution of these types at individual occurrences. In a later section, I describe the floodplain dynamics along the Snake in relation to possible successional pathways of these communities and its affect on Ute ladies tresses populations.

*Eleocharis rostellata* (wandering spike-rush) community type: This is the odd ball for Idaho Ute ladies tresses occurrences. Only the Kelly's Island population (EO#001) occurs in this community type and Kelly's Island is the only place this community is known to occur on the Snake River. This community is widely scattered in eastern Idaho (Jankovsky-Jones 1996; 1997a), with at least two occurrences containing *Spiranthes romanoffiana* (fens near Blackfoot Reservoir and in the Teton Valley). In central Idaho, the wandering spike-rush community is uncommon, most often found in wetland habitats influenced by geothermal waters (Moseley 1995), but also occurring along at least one spring creek (Jankovsky-Jones 1997b). Wandering spike-rush occurs in nearly monotypic stands in this community type and overall species diversity is low. At Kelly's Island, this community occurs in an old river channel at the center of the island that no longer regularly floods. See Appendix B in Jankovsky-Jones (1997a) for a more detailed description of this community type.

*Elaeagnus commutata* (silverberry) community type: This is the primary habitat of Ute ladies tresses in Idaho. Most populations occur here. The silverberry community type occurs as a narrow, often linear band in the transition zone between sedge (*Carex*)-dominated areas or open water in the center of the channels and the higher terraces dominated by old narrowleaf cottonwood stands. Sedge-dominated areas have standing water and are too wet, while the higher terraces, which usually have an understory of *Poa pratensis* (Kentucky bluegrass), are too dry. Ute ladies tresses habitat is characterized by a dense sward of the rhizomatous grass, *Agrostis stolonifera* (redtop), covering the ground, with an overstory of widely scattered silverberry. Shrub canopy cover averages less than 10%. In Idaho, the silverberry community type is restricted to the Snake River, between Palisades Dam and the confluence with the

Henrys Fork. See Appendix B in Jankovsky-Jones (1997a) for a more detailed description of this community type.

*Salix exigua* (coyote willow)/*Agrostis stolonifera* cover type: This is essentially the same in composition, structure, and its position on the hydrologic gradient as the silverberry community type described above, except silverberry is absent. Coyote willow is the dominant shrub, albeit in relatively low cover, and redtop forms a dense sward in the understory. This habitat is rarely encountered on the Snake River. Coyote willow usually occurs in very dense stands.

*Equisetum variegatum* (horsetail) cover type: At three occurrences, Ute ladies tresses occurs in a dense sward of a small-stemmed horsetail, either *Equisetum variegatum* and/or possibly *E. laevigatum*; they are difficult to key, but apparently both species are present, with the former being more common. The horsetail forms a near monoculture over small areas and redtop occurs in only minor amounts. Shrubs are virtually absent. The exotic wetland forb, *Myosotis scorpioides*, is prominent in this habitat. *Equisetum variegatum* and *E. laevigatum* (as well as *E. hymenale*) are all common associates in the silverberry community type, but do not attain the ground cover dominance as they do here.

**Micro-scale characteristics:** At this scale, I describe the within-community microsites, microhydrologic gradients, and associated species.

#### Rangewide:

Ute ladies tresses is a wetland species and, although apparently not on the current national list of plant species occurring in wetlands, it will be added in the next update and have a wetland indicator status of obligate (P. Guillory, U.S. Fish and Wildlife Service, Boise, personal communication, 1998). Its habitat is often inundated early in the growing season, draining gradually as the season progresses and water levels recede. Groundwater is usually close enough to the surface that the substrate retains subsurface moisture through the growing season. During drought years, however, substrate moisture may not be present within 12 inches of the soil surface (U.S. Fish and Wildlife Service 1998).

There are many rangewide associates, but as would be expected from a species covering such a huge geographic area, there are regional differences. Species that have a high constancy at Ute ladies tresses sites throughout its range include *Agrostis stolonifera*, *Juncus balticus*, *Juncus longistylus*, *Equisetum laevigatum*, and *Habenaria hyperborea* (Heidel 1998). Heidel (1998) and U.S. Fish and Wildlife Service (1998) have extensive lists and descriptions of vascular plant species associated with Ute ladies tresses throughout its range. Refer to these reports (especially Heidel 1998) for more information.

## Idaho:

The rangewide hydrologic characteristics described above hold true for Idaho populations of Ute ladies tresses. Most populations are submerged during spring runoff. The sandy and cobbly substrates drain readily, but the soil surface is kept moist throughout the growing season, fed by capillary fringe from the water table. It does not occur in the standing-water habitats of adjacent channels nor does it occur on the higher benches where the hydraulic lift is not enough to keep the near-surface soils moist enough. Water availability to plants from hydraulic lift varies considerably among substrate textures along the Snake River (Merigliano 1996a). In Idaho, *Agrostis stolonifera* is the best indicator of ideal microhydrologic conditions for Ute ladies tresses. *Eleocharis palustris* and *Carex* species (mostly *C. utriculata*) are common indicators of standing-water habitats, while *Poa pratensis* indicates soil surfaces that are too dry. *Poa pratensis* occasionally occurs with Ute ladies tresses, but always in low amounts and always with *Agrostis stolonifera* as the dominant.

The range of Ute ladies tresses in Idaho more or less coincides with the range of *Elaeagnus commutata* (silverberry) in the state. Silverberry has a limited distribution in Idaho, and the CDC and Idaho Native Plant Society used to track it as a species of conservation concern. It was only dropped from the Idaho list in 1997 (Idaho Native Plant Society 1997). In eastern Idaho, silverberry is largely restricted to the Snake River floodplain from Market Lake (ca. 12 river miles below the Henrys Fork confluence), upstream to Palisades Dam. It is nearly continuous along this stretch of river. A single stand is also known from the Willow Creek drainage above Ririe Reservoir, ca. 10 south of the Snake River. In central Idaho, a few small, widely scattered populations are known from the banks of the East Fork and main Salmon River above Challis.

Even more precisely, there is a nearly exact coincidence of Ute ladies tresses populations with the distribution of the *Elaeagnus commutata* community type (ct) along the Snake River. The lowest occurrence of this ct that I observed is the site of the lowest orchid population on Annis Island (EO#006). Likewise, the upstream limit of this ct largely coincides with the highest population at Squaw Creek Islands (EO#020). A small stand of the silverberry ct occurs near the mouth of Box Canyon, 4.5 river miles above Squaw Creek Islands. In fact, this stand appeared to be great potential habitat, but was so thoroughly and utterly mowed by cattle that I could not identify most of the associated herbaceous species during a search in September. Silverberry populations extend downstream for about 13 miles below the lowest orchid population, but preliminary observations indicate they occur as small stands of scattered individuals and never form stands that could be considered an occurrence of the silverberry ct. Further inventories between Market Lake and the Henrys Fork confluence in 1998 will elucidate the distribution of the community type further.

Below is a list of vascular plant species that are directly associated with Ute ladies tresses populations in Idaho. Exotic species are marked with an asterisk. Refer to the occurrence records in Moseley (1997b) for the species associated with individual occurrences.

#### SHRUBS & TREES

*Alnus incana* (sprouts)  
*Betula occidentalis*  
*Cornus sericea*  
\**Elaeagnus angustifolia*  
*Elaeagnus commutata*  
*Populus angustifolia* (sprouts)  
*Rosa woodsii*  
*Salix bebbiana*  
*Salix exigua*  
*Salix lutea*

#### GRASSES & GRAMINIDS

\**Agrostis stolonifera*  
*Calamagrostis inexplansa*  
*Carex lanuginosa*  
*Eleocharis rostellata*  
*Juncus balticus*  
*Juncus ensifolius*  
*Juncus nevadensis*  
*Juncus tenuis*  
*Muhlenbergia asperifolia*  
\**Phleum pratense*  
\**Poa pratensis*  
*Triglochin maritima*

#### FORBS

*Aster ascendens*  
*Aster spathulatus* (= *A. occidentalis*)  
*Castilleja exilis*  
\**Cirsium* sp. (seedling)  
*Glycyrrhiza lepidota*  
*Habenaria hyperborea*  
*Mentha arvensis*  
\**Myosotis scorpioides*  
\**Plantago major*  
*Polygonum lapathifolium*  
*Potentilla anserina*  
*Solidago occidentalis*  
*Solidago missouriensis*  
\**Sonchus arvensis*  
\**Taraxacum officinale*  
\**Trifolium pratense*  
\**Trifolium repens*  
*Viola* sp.

#### PTERIDOPHYTES

*Equisetum hymenale*  
*Equisetum laevigatum*  
*Equisetum variegatum*

### ASSESSING POTENTIAL HABITAT

From the habitat discussion above, a series of macro- meso- and micro-scale indicators can help land managers in Idaho assess whether or not they administer suitable habitat and aid in preparing for field inventories of project areas:

**Macro-scale indicators:** In southern Idaho, riparian and wetland habitats that are within the sagebrush-steppe and pinyon-juniper woodland zones below 7,000' should be considered prime. Southern Idaho habitats that are at lower timberline or in the shrub-steppe or woodland transition to montane coniferous forest should also be considered suitable if they are below 7,000'. I consider the steppe zone of northern Idaho, including the Palouse Prairie, Rathdrum Prairie, and canyon grasslands, to be a possibility for potential habitat. The upper elevations of this zone ranges from 2,500' on the Rathdrum and Palouse prairies to around 4,500' in the canyon grasslands. I don't consider the montane coniferous forest, subalpine coniferous forest, and alpine zones to be likely places to find Ute ladies tresses.

From an ecoregional classification standpoint, Ute ladies tresses populations are known from every Ecoregion that occurs in Idaho. At the next lower level of Bailey's (1995) classification

hierarchy, populations are known from four Sections that occur in Idaho (McNab and Avers 1994), as follows:

- Idaho populations above Heise occur in the Overthrust Mountains Section (M331D) of the Southern Rocky Mountains Steppe-Open Woodland-Coniferous Forest-Alpine Meadow Ecoregion (M331). This section includes the mountain ranges in southeastern Idaho, south of the Teton Valley.
- Idaho populations below Heise occur in the Snake River Basalts Section (342D) of the Intermountain Semidesert Ecoregion (342). This section encompasses the eastern Snake River Plain from Bliss to Island Park.
- Some of the Montana populations occur in the Beaverhead Mountains Section (M332E) of the Middle Rocky Mountains Steppe-Coniferous Forest-Alpine Meadow Ecoregion (M332). This Section includes the mountain ranges and large intermontane valleys of east-central Idaho.
- The Washington population occurs in the Okanogan Highlands Section (M333A) of the Northern Rocky Mountains Forest-Steppe-Coniferous Forest-Alpine Meadow Ecoregion (M333). This section includes the Selkirk Mountains and Priest and Pend Oreille valleys of the Idaho panhandle.

**Meso-scale indicators:** Ute ladies tresses is a species of the lowlands. In the Rocky Mountains and Intermountain region it most often occurs along medium to large streams and rivers of moderate gradient, generally as they near the edge of the mountains or somewhat out onto the plains, but before they start to slow down and meander. The occupied communities along rivers in other states tend to be typical, widespread riparian communities types in Idaho, mostly graminoid openings within riparian shrublands dominated by common taxa. In Idaho, *Agrostis stolonifera* openings within riparian shrub communities, especially *Salix exigua*, should be considered prime potential habitat if other meso- and macro-scale indicators are present. Given the perfect coincidence of Ute ladies tresses and the primary distribution of *Elaeagnus commutata* in Idaho, outlying populations of silverberry in the Salmon River and Willow Creek drainages should be checked.

In other states, Ute ladies tresses occasionally occurs in broad intermontane valleys in spring-fed wetlands isolated from dynamic riparian systems. In the Northern Rocky Mountain and Intermountain portions of its range, these wetland communities include alkaline fens (Montana) and *Eleocharis rostellata* communities (Idaho, Utah, and Washington). The fen communities in Montana include *Carex simulata*, *Eleocharis pauciflora*, *Agrostis stolonifera*, and *Juncus balticus* community types (Heidel 1998). These are all widespread associations in Idaho, but only in a few cases do they occur in low elevation alkaline fens. The *Eleocharis rostellata* community is uncommon in Idaho. It occurs in thermally influenced wetlands in central Idaho (Moseley 1995) and various, non-thermal wetland settings in the far eastern part of the state.

**Micro-scale indicators:** Soil must be moist to the surface throughout the growing season, except possibly during severe droughts. This moisture level is usually maintained by capillary fringe from the water table. *Agrostis stolonifera* is the best indicator of the proper hydrologic setting for Ute ladies tresses within riparian communities, although it tends to have a slightly wider amplitude along the hydrologic gradient. Populations can be flooded in the spring. It has not been found to occur in dense shrub patches in Idaho, although it can occur in small grassy openings within dense stands.

## FLOODPLAIN DYNAMICS IN RELATION TO UTE LADIES TRESSES HABITAT

As Merigiano (1996a) stated, river systems are inherently dynamic and the Snake River is no exception. The dynamics of the floodplain and its vegetation through space and time must be considered when assessing the long-term viability of Ute ladies tresses and its habitat along the Snake. Luckily two things happened recently that elucidate the relationship between these dynamics and the ecology of Ute ladies tresses populations. The first (and minor) event was the exceptionally high flows that took place in 1997, and the observations that I made on its effect on Ute ladies tresses populations. The second (and much more important) is the research conducted by Mike Merigiano on the vegetation and floodplain dynamics along the Snake River (Merigiano 1994; 1996a; 1996b; Merigiano and Potts 1994). Observations and information from both of these, relative to Ute ladies tresses, are summarized below.

**1997 flood observations:** During June 1997, the Snake River flooded at a level unprecedented since Palisades Dam was closed in 1956. Martin (1998) provides an excellent background summary for the flood. From May 12 through June 5, Palisades Dam releases were between 16,000 to 18,000 cfs. The June 6 through June 9 releases were increased, but remained below the 24,500 cfs considered by the Bureau of Reclamation to be flood stage at Heise. Flows at Heise were above 39,000 cfs between June 12 and June 22, with a peak of about 43,000 cfs on June 14. The flow at Heise was considered about a 10-year event prior to Palisades Dam. The unregulated flow at Palisades Dam, calculated as if no dams were available to capture runoff, was about 56,000 cfs, or about a 100-year event or greater.

On June 12, 1997, I visited two of the four occurrences that were known at the time, Kelly's Island (EO#001) and Falls Campground (EO#004). The other two were inaccessible due to flooding. Later in the summer, I visited all but two of the 20 occurrences that were known by the end of the 1997 inventories. All occurrences I visited in June were under water, including Kelly's Island. Observations later in the season after the flow had receded indicated that the high water line in June had been well above the elevation of all known populations. The effect of the high flows on the habitat and the populations appeared to vary, however, as discussed below.

Four populations (EO#001-004) were discovered in 1996 and had pre-flood data. Many of the plants were flagged. The *Eleocharis rostellata* community at Kelly's Island (EO#001) was probably under water for the first time in many years, possibly since Palisades Dam's closure.

There was no major sediment deposition at this site that would cover the habitat, but I could not find any Ute ladies tresses plants in the middle of the *Eleocharis rostellata* stand as they were in 1996. Instead, plants were flowering along the periphery of the stand, where few were seen in 1996. This may have been the result of prolonged ponding of water in this mid-island depression, a topographic feature unlike any other population in Idaho. At Rattlesnake Point (EO#002) a thin sand veneer was deposited over the population. This did not appear to hinder the growth of Ute ladies tresses and associated species, although only three plants were observed in 1997, compared to 15 in 1996.

Some of the most interesting observations were made at Warm Springs Bottom (EO#003). The upstream portion of the population is near the river, at the entrance of a large channel that carries water only at high flows. During the flood, sands as deep as 1.5 feet were deposited on this 5' x 150' patch. No ladies tresses were observed (five plants were seen in 1996), silverberry plants were dead, and few redtop culms were emerging from the sand where it formed a dense sward in 1996. The only species with high cover was *Equisetum variegatum*, where it appears to be aggressively colonizing the fresh sands. This may represent an early sere of the *E. variegatum* cover type described in a previous section, where the horsetail forms a sward, redtop has very low cover, and no shrubs are present. Community succession may eventually lead to shrubs, redtop, and Ute ladies tresses increasing in density, possibly to the point where shrub density becomes too great and Ute ladies tresses is excluded until the next flood starts the cycle again. A similar event took place at Falls Campground (EO#004) where the one plant observed in 1996 was probably covered by a deep sand deposit. I say probably because the flagging was washed away and I couldn't locate the exact spot.

Although there was no 1996 information, it appeared that portions of several populations discovered in 1997 were also buried by deep sand deposits during the flood (e.g., Mud Creek Bar EO#009 and Pine Creek #5 EO#014). Monitoring of these sites again in 1998 (and hopefully beyond) will help determine if these populations were extirpated or suffered only a temporary setback.

**Merigliano floodplain and vegetation dynamics research:** Merigliano (1996a) investigated the cottonwood ecosystem along the Snake River from Palisades Dam to Heise. His primary focus was vegetation dynamics in time and space, with emphasis on the cottonwood component. Because riparian vegetation is intricately related to the river's physical processes, he also studied these. His research was aimed primarily at developing restoration models for the floodplain communities under flow regimes controlled by Palisades Dam. In doing so, he also created a time-series view of island and river bar development and, by extension, Ute ladies tresses habitat dynamics. Keep in mind, however, Merigliano's research occurred prior to the 1997 flood.

Merigliano (1996a) mapped the stand ages of most (all?) cottonwood stands along this segment of the Snake River, some in great detail. These maps contain the location of eight occurrences of Ute ladies tresses. From the stand ages, he inferred the date and rates of island and bar development, because cottonwood will regenerate only on new surfaces deposited by floods. By

extension then, we can also infer the maximum age of Ute ladies tresses habitat within or adjacent to these stands (Table 4). It appears that substrates on which these eight ladies tresses populations occur today are mostly less than 100 years old, with the youngest being 40-50 years old (Table 4). The most graphic example appears in his Figure 27, which includes a pair of photos from 1951 and 1987 showing the Squaw Creek Islands populations (EO#020). The 1951 photo shows exposed gravel and sand bars, that were apparently deposited in the 1940's, where Ute ladies occurs today.

The youngest ages in Table 4 coincide with the closure of Palisades Dam. Apparently no or little recruitment of new Ute ladies tresses habitat has taken place since then. This is the same scenario that Merigliano documented for the narrow-leaf cottonwood community, whose age class structure is advancing throughout the river segment, with little recruitment of new stands since Palisades Dam. In other words, the advancing age and eventual decline of cottonwood communities because of flow regime alterations appears to be an excellent indicator for the decline of other aspects of biotic diversity along the Snake River, including bald eagle nesting and roosting trees and Ute ladies tresses habitat.

Table 4. Maximum age of some Ute ladies tresses habitats in 1997, inferred from the 1992 age of adjacent cottonwood stands. Because an occurrence can be comprised of several populations, ages are given separately for each population. The occurrences are arranged downstream to upstream.

Occurrence Name	Occurrence Number	Maximum age of Ute ladies tresses habitat (years)	Reference Plate or Figure in Merigliano (1996a)
Warm Springs Bottom	003	78-101; 59-80	Plates 9, 15
Lufkin Bottom	011	65-77; 78-86; 79; 73	Plates 7, 15
Pine Creek #5	014	31-54; 60; 44-51; 47	Plates 4, 14
Lower Conant Valley	017	80; 80-84; 84; 80-84	Figure 28; Plates 3, 13
Upper Conant Valley	018	71-130	Plate 12
Lower Swan Valley	019	41-55	Plate 11
Falls Campground	004	106-130; 71-85	Plate 11
Squaw Creek Islands	020	42; 43-45; 55	Figure 27; Plate 2



## POPULATION BIOLOGY

The population biology of Ute ladies tresses has been thoroughly reviewed elsewhere and it would be redundant for me to entirely repeat it here. I highly recommend Heidel's (1998) review of the population biology of Ute ladies tresses in relation to the broader literature on orchid biology. Another excellent work is Anna Arft's (1995) Ph.D. Dissertation pertaining to the genetics, demography, and conservation management of Ute ladies tresses. She summarized her work in an "executive summary" that appeared in the Colorado Native Plant Society's newsletter *Aquilegia* (Arft 1994). Other good references on the population biology of Ute ladies tresses include reports by the U.S. Fish and Wildlife Service (1995; 1998) and Ute Ladies Tresses Recovery Team (1995). In this section I discuss just observations and data pertaining to the Idaho populations, sometimes in relation to what is known about the species elsewhere in its range.

**Phenology:** After two years of observations, it appears that Idaho populations of Ute ladies tresses begin flowering in mid-August and continue for about 1.5 months. Some plants were still observed in full flower during the first week of October in both 1996 and 1997. Similar to what has been observed in Montana (Heidel 1998), flowering can vary significantly among individuals within a population, with up to a four-week off-set. For example, some plants at Squaw Creek Islands (EO#020) had dehiscing fruits in mid-September, while others were in full flower.

In relation to *Spiranthes romanzoffiana*, Ute ladies tresses generally appears to flower nearly a month later, at least in eastern Idaho. In 1996 and 1997, *S. romanzoffiana* at Woods Creek Fen in the Teton Valley, 23 miles north and 1,000 feet higher in elevation, was in full flower during mid- to late July and had dehiscing fruits at the time the lower-elevation Ute ladies tresses was flowering on the Snake River. The same pattern was also observed at the Henry Stampede Park fen near Blackfoot Reservoir, about 38 miles south and 1,000 feet higher than the Snake River. I also observed *S. romanzoffiana* in full flower in late July at 10,000 feet in the Pioneer Mountains near Ketchum. Some variation exists, however, as *S. romanzoffiana* was observed flowering in early September along the Salmon River near Sunbeam (E. Rey-Vizgirdas, U.S. Fish and Wildlife Service, Boise, personal communication, 1998).

**Population size and condition:** A total of 1,071 plants were observed in Idaho in 1997. Table 5 contains the population sizes observed during 1997 for the 20 Idaho occurrences. For comparison, the 1996 population data are included for the four populations known at the time. Keep in mind that these numbers represent mostly flowering individuals, which should be taken as a very conservative low estimate of actual population size. Refer to Heidel (1997) for an excellent review of observed population fluctuations in relation to seasonal dormancy of Ute ladies tresses. In general, Ute ladies tresses occurs at very low densities and the area occupied by these population is very small, most often just a few square feet. Warm Springs Bottom (EO#003) is the exception, with this large population covering much area. Refer to Moseley (1997b) for more detailed population data for each occurrence.

Table 5. Demographic details for *Spiranthes diluvialis* occurrences in Idaho. Occurrences are arranged from downstream to upstream.

Occurrence Name	Occurrence Number	Number of plants observed in 1997	Number of plants observed in 1996
Annis Island	006	35	---
Lorenzo Levee	008	1	---
Archer Powerline	015	145	---
Twin Bridges Island	007	160	---
Railroad Island	005	9	---
Kelly's Island	001	22	12
Mud Creek Bar	009	9	---
Rattlesnake Point	002	4	15
TNC Island	010	9	---
Warm Springs Bottom	003	301	173
Lufkin Bottom	011	61	---
Gormer Canyon #5	012	10	---
Gormer Canyon #4	013	10	---
Pine Creek #5	014	6	---
Pine Creek #3 & #4	016	18	---
Lower Conant Valley	017	127	---
Upper Conant Valley	018	61	---
Lower Swan Valley	019	1	---
Falls Campground	004	14	1
Squaw Creek Islands	020	168	---

**Reproductive biology:** Again, refer to Heidel for a review of what is known about the reproductive biology of Ute ladies tresses. Very little is known specifically about the Idaho populations. Reproduction in Ute ladies tresses is sexual and requires insect vectors (Sipes and Tepedino 1995). This aspect of Ute ladies tresses conservation management should be carefully considered by managers in assessing the long-term impact of livestock grazing on species and population viability. Rare plant pollinators can be negatively impacted by livestock grazing (Sugden 1985). All of the fruits I observed in 1996 and 1997 appeared to be viable.

**Competition:** In Idaho, Ute ladies tresses generally occurs in stands dominated by one species, either *Eleocharis rostellata*, *Equisetum variegatum*, or most often *Agrostis stolonifera*. The former two are native species, while the latter is an escaped or seeded exotic that has become naturalized throughout the state. It is unknown if the introduction of *A. stolonifera* has affected population density or persistence. Apparently, competition for light (or possibly nutrients) may be a factor, as Ute ladies tresses is rarely found in dense shrub stands, although openings they occupy can be shaded by surrounding shrubs and trees.

**Herbivory:** Many of the populations of Ute ladies tresses in Idaho occur in public-land cattle allotments administered by the BLM and/or the Targhee National Forest. In her three year monitoring study in Colorado, Arft (1995) found that fruit set was the single most important biological factor influencing the persistence of Ute ladies tresses and that the grazing treatment resulted in lower fruit set than ungrazed treatments.

Many of the Idaho populations are grazed, often late in the season during the flowering and fruiting period for Ute ladies tresses. Occasionally wild ungulates (moose and deer) selectively graze ladies tresses inflorescences. Cattle love the redtop turf in which it grows and they selectively graze the localized stands, often to a stubble height of a few millimeters, clipping all ladies tresses plants along with it. This has been observed to eliminate all flowering/fruiting stems of the season (e.g., Falls Campground EO#004 in 1997) or leave standing only plants that are close to the base of shrubs and, therefore, physically protected from grazing (e.g., Annis Island EO#006 in 1997 and Falls Campground EO#004 in 1996).

**Land ownership and management responsibility:** Fifteen of the 20 occurrences are entirely or partially on public land managed by the BLM (Table 3; and see Moseley 1997b). Three occurrences occur entirely on the Targhee National Forest. Two occurrences occur entirely on private land below Heise and the upstream-most occurrence at Squaw Creek Islands is partially on private land. Management of the Twin Bridges Island occurrence is shared by Madison County and the BLM.

**Land use and possible threats:** As documented in a previous section, alteration of the flow regime resulting from the operation of Palisades Dam is the single biggest long-term threat facing the species in Idaho (see section on Floodplain Dynamics in Relation to Ute Ladies Tresses Habitat).

Regarding short-term, localized land use impacts and possible threats, every occurrence except EO#008 and EO#019 has some human activity taking place within them (Table 6). It is not known, however, the degree to which these pose a threat to persistence and viability of Ute ladies tresses populations.

Also refer to U.S. Fish and Wildlife Service (1998) for a good review of rangewide threats to the viability of Ute ladies tresses populations.

## **ASSESSMENT AND RECOMMENDATIONS**

**General assessment of vigor, trends, and status:** My assessment of the Idaho populations is that all Idaho populations have existing and potential threats and are vulnerable. Flow regime alteration by Palisades Dam represents the most significant long-term threat to species viability in the Snake River metapopulation, while cattle grazing represents the most significant short-term threat. In my opinion, flow alteration is the greater threat of the two.

**Recommendation to the U.S. Fish and Wildlife Service:** While the Idaho status information summarized in this report is a necessary component, it does not provide sufficient scope or information for making rangewide status decisions. As with last year's report (Moseley 1997a), this status survey report should be considered an interim summary. With Section 6 funding, information from 1998 surveys will again be summarized in a status report next year. Stay tuned.

**Recommendations to the other federal agencies:** The U.S. Fish and Wildlife Service will work with the BLM and Forest Service on management guidelines for the Ute ladies tresses populations on federal land.

In addition, three other important actions will take place along the Snake River in 1998, performed by the CDC with funding from the BLM and U.S. Fish and Wildlife Service: 1) a resurvey of suitable-appearing, but unoccupied habitat to determine if plants were missed in 1997 due to prolonged dormancy and/or phenological timing; 2) monitor population levels of known populations and compare with 1996 and 1997 data to determine variability of observable plant numbers; and 3) finish the intensive survey of the remaining segment of the Snake River corridor from the Henry's Fork confluence to Market Lake.

**Recommendation to the Heritage Network:** Ute ladies tresses is now known from about 90 occurrences rangewide. The current conservation rank for Ute ladies tresses, "globally imperiled" or G2, is outdated and needs to be revised. A more appropriate designation would be "rare or uncommon, but not imperiled" or G3, which typically is given to species with 21 to 100 occurrences (Master 1991).

Table 6. Known activities at *Spiranthes diluvialis* occurrences in Idaho. Occurrences are arranged from downstream to upstream.

Occurrence Name	Occurrence No.	Human Activities
Annis Island	006	Cottonwood Grazing Allotment (BLM)
Lorenzo Levee	008	undisturbed private land
Archer Powerline	015	private grazing land; Utah Power and Light powerline right-of-way
Twin Bridges Island	007	cattle grazing (BLM?); adjacent to county campground and boat ramp
Railroad Island	005	Tressel Grazing Allotment (BLM)
Kelly's Island	001	adjacent to BLM fee campground; group recreational activities; trespass cattle grazing
Mud Creek Bar	009	intermittent outfitter camp; lots of bank fishing; some dispersed camping; trespass cattle grazing
Rattlesnake Point	002	BLM land unofficially within Targhee NF grazing allotment
TNC Island	010	dispersed camping
Warm Springs Bottom	003	Targhee NF grazing allotment; very popular fishing area; dispersed camping; ATV area
Lufkin Bottom	011	designated river camping area
Gormer Canyon #5	012	designated river camping area
Gormer Canyon #4	013	designated river camping area
Pine Creek #5	014	designated river camping area; 5-Ways Grazing Allotment (BLM)
Pine Creek #3 & #4	016	designated river camping area; 5-Ways Grazing Allotment (BLM)
Lower Conant Valley	017	designated river camping area
Upper Conant Valley	018	historical trespass grazing (seems to be solved)

Lower Swan Valley	019	apparently none
Falls Campground	004	Targhee NF grazing allotment; fee campground
Squaw Creek Islands	020	historical livestock trespass; leafy spurge invasion

**Recommendations regarding present or anticipated activities:** The Snake River Basin Office of the U.S. Fish and Wildlife Service has prepared Section 7 consultation guidelines for Idaho, the most recent being dated 2/4/98 (U.S. Fish and Wildlife Service 1998). They will be updated annually or as needed. These guidelines characterize potential habitat and outline survey protocols. The CDC and the Snake River Basin Office are in the process of preparing maps of potential habitat based on the distribution of important associated species and plant communities that are known habitat for Ute ladies tresses.

At the moment, I believe riparian habitats in east-central and eastern Idaho present the best opportunities for discovering new populations of Ute ladies tresses in the state, although over 500 miles of stream and river corridors were surveyed in this area during 1996 and 1997, and it is still known only from the upper Snake River.

As mentioned previously, cattle grazing in redtop stands is often severe. This can affect survey results. If an area looks to be good potential habitat, but the redtop turf has mowed-lawn appearance, the site should be noted and resurveyed the following year prior to cattle turn-out.

### REQUEST TO BOTANISTS AND SURVEYORS!

As mentioned in a previous section, the CDC has compiled all known Ute ladies tresses survey routes for 1996 and 1997. The routes are mapped on 1:100,000-scale maps, identified by surveyor and year. Copies are available upon request from the CDC office in Boise. We plan to do the same thing in 1998. Please send a copy of all survey reports and maps to me so I can keep the master set of maps up-to-date. Thanks.

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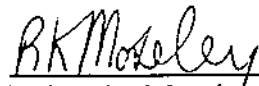
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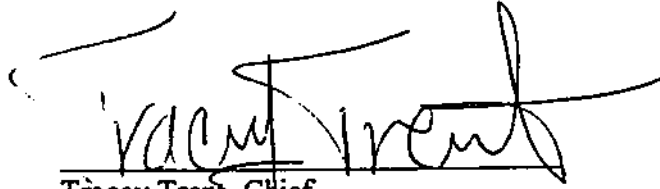
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